

# COE 197 ME08: DOCKER

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## 1. Running Containers

```
PS C:\Users\Jalen> docker images
REPOSITORY    TAG       IMAGE ID       CREATED        SIZE
ubuntu        16.04     9ff95a467e45   4 weeks ago   135MB
PS C:\Users\Jalen> docker pull ubuntu:16.10
Error response from daemon: Head https://registry-1.docker.io/v2/library/ubuntu/manifests/16.10: Get https://auth.docker.io/token?account=brogelio&scope=repository%3Alibrary%2Fubuntu%3Apull&service=registry.docker.io: dial tcp: lookup auth.docker.io on 192.168.65.5:53: read udp 192.168.65.4:49093->192.168.65.5:53: i/o timeout
PS C:\Users\Jalen> docker run ubuntu:16.04 /bin/echo 'Hello world!'
Hello world!
PS C:\Users\Jalen> docker ps
CONTAINER ID   IMAGE     COMMAND   CREATED   STATUS    PORTS   NAMES
PS C:\Users\Jalen> docker ps -a
CONTAINER ID   IMAGE     COMMAND   CREATED        STATUS      PORTS   NAMES
57fc613fa108   ubuntu:16.04   "/bin/echo 'Hello wo..."  53 seconds ago   Exited (0) 49 seconds ago   condescending_napier
PS C:\Users\Jalen> docker run ubuntu:16.04 /bin/bash
PS C:\Users\Jalen> docker run ubuntu:16.04 /bin/bash -it
bash: cannot set terminal process group (-1): Inappropriate ioctl for device
bash: no job control in this shell
root@08d86f3ae821:/# exit
PS C:\Users\Jalen> docker run -it ubuntu:16.04 /bin/bash
root@5689d8c15d83:/# pwd
/
root@5689d8c15d83:/# ls
bin boot dev etc home lib lib64 media mnt opt proc root run sbin srv sys tmp usr var
root@5689d8c15d83:/# exit
exit
PS C:\Users\Jalen>
```

```
PS C:\Users\Jalen> docker run -d ubuntu:16.04 /bin/sleep 3600
109c887b1eca0c63060bae3501a752d4c8266e3d67400e3173c1663a63fda707
PS C:\Users\Jalen> docker ps
CONTAINER ID   IMAGE     COMMAND   CREATED        STATUS      PORTS   NAMES
109c887b1eca   ubuntu:16.04   "/bin/sleep 3600"  19 seconds ago   Up 15 seconds   recursing_wright
PS C:\Users\Jalen> docker ps -a
CONTAINER ID   IMAGE     COMMAND   CREATED        STATUS      PORTS   NAMES
109c887b1eca   ubuntu:16.04   "/bin/sleep 3600"  26 seconds ago   Up 23 seconds   recursing_wright
5689d8c15d83   ubuntu:16.04   "/bin/bash"       5 minutes ago   Exited (0) 4 minutes ago   xenodochial_sanderson
08d86f3ae821   ubuntu:16.04   "/bin/bash -it"   5 minutes ago   Exited (0) 5 minutes ago   peaceful_lewin
064f982b6d15   ubuntu:16.04   "/bin/bash"       5 minutes ago   Exited (0) 5 minutes ago   competent_knuth
57fc613fa108   ubuntu:16.04   "/bin/echo 'Hello wo..."  7 minutes ago   Exited (0) 7 minutes ago   condescending_napier
PS C:\Users\Jalen> docker exec -it 109c /bin/bash
root@109c887b1eca:/# ps aux
USER      PID %CPU %MEM    VSZ   RSS TTY      STAT START   TIME COMMAND
root         1   0.0   0.0   4372   664 ?        Ss   20:58   0:00 /bin/sleep 3600
root        7   0.4   0.0  18236  3268 pts/0    Ss   21:00   0:00 /bin/bash
root       17   0.0   0.0  34420  2856 pts/0    R+   21:00   0:00 ps aux
root@109c887b1eca:/# exit
exit
PS C:\Users\Jalen> docker ps
CONTAINER ID   IMAGE     COMMAND   CREATED        STATUS      PORTS   NAMES
109c887b1eca   ubuntu:16.04   "/bin/sleep 3600"  2 minutes ago   Up 2 minutes   recursing_wright
PS C:\Users\Jalen> docker stop 109c
109c
PS C:\Users\Jalen> docker ps
CONTAINER ID   IMAGE     COMMAND   CREATED        STATUS      PORTS   NAMES
109c887b1eca   ubuntu:16.04   "/bin/sleep 3600"  3 minutes ago   Exited (137) 23 seconds ago   recursing_wright
5689d8c15d83   ubuntu:16.04   "/bin/bash"       7 minutes ago   Exited (0) 7 minutes ago   xenodochial_sanderson
08d86f3ae821   ubuntu:16.04   "/bin/bash -it"   8 minutes ago   Exited (0) 8 minutes ago   peaceful_lewin
064f982b6d15   ubuntu:16.04   "/bin/bash"       8 minutes ago   Exited (0) 8 minutes ago   competent_knuth
57fc613fa108   ubuntu:16.04   "/bin/echo 'Hello wo..."  10 minutes ago   Exited (0) 9 minutes ago   condescending_napier
```

```

PS C:\Users\Jalen> docker rm 109c
109c
PS C:\Users\Jalen> docker ps -a
CONTAINER ID   IMAGE          COMMAND                  CREATED        STATUS        PORTS          NAMES
5689d8c15d83   ubuntu:16.04   "/bin/bash"             9 minutes ago   Exited (0)    8 minutes ago   xenodochial_san
derson
08d86f3ae821   ubuntu:16.04   "/bin/bash -it"         9 minutes ago   Exited (0)    9 minutes ago   peaceful_lewin
064f982b6d15   ubuntu:16.04   "/bin/bash"             9 minutes ago   Exited (0)    9 minutes ago   competent_knuth
57fc613fa108   ubuntu:16.04   "/bin/echo 'Hello wo..." 11 minutes ago   Exited (0)    11 minutes ago   condescending_n
apier
PS C:\Users\Jalen> docker rm $(docker ps -a -q)
5689d8c15d83
08d86f3ae821
064f982b6d15
57fc613fa108
PS C:\Users\Jalen> docker run --rm ubuntu:16.04 /bin/echo 'Hello and goodbye!'
Hello and goodbye!
PS C:\Users\Jalen> docker ps -a
CONTAINER ID   IMAGE          COMMAND                  CREATED        STATUS        PORTS          NAMES
PS C:\Users\Jalen>

```

## 2. Changing Images

```

root@9d1149a27139:/# ping google.com
PING google.com (216.58.200.238) 56(84) bytes of data.
64 bytes from 216.58.200.238: icmp_seq=1 ttl=37 time=72.5 ms
64 bytes from 216.58.200.238: icmp_seq=2 ttl=37 time=54.0 ms
64 bytes from 216.58.200.238: icmp_seq=3 ttl=37 time=56.0 ms
64 bytes from 216.58.200.238: icmp_seq=4 ttl=37 time=45.5 ms
64 bytes from 216.58.200.238: icmp_seq=5 ttl=37 time=54.6 ms
64 bytes from 216.58.200.238: icmp_seq=6 ttl=37 time=54.8 ms
64 bytes from 216.58.200.238: icmp_seq=7 ttl=37 time=48.0 ms
64 bytes from 216.58.200.238: icmp_seq=8 ttl=37 time=43.0 ms
64 bytes from 216.58.200.238: icmp_seq=9 ttl=37 time=46.0 ms
^C
--- google.com ping statistics ---
9 packets transmitted, 9 received, 0% packet loss, time 10161ms
rtt min/avg/max/mdev = 43.087/52.745/72.509/8.327 ms
root@9d1149a27139:/# exit
exit
PS C:\Users\Jalen> docker ps -a
CONTAINER ID   IMAGE          COMMAND                  CREATED        STATUS        PORTS          NAMES
9d1149a27139   ubuntu:16.04   "/bin/bash"             2 minutes ago   Exited (0)    4 seconds ago   gallant_bhaskara
PS C:\Users\Jalen> docker commit --help

Usage:  docker commit [OPTIONS] CONTAINER [REPOSITORY[:TAG]]

Create a new image from a container's changes

Options:
  -a, --author string      Author (e.g., "John Hannibal Smith
                           <hannibal@a-team.com>")
  -c, --change list        Apply Dockerfile instruction to the created image
  -m, --message string     Commit message
  -p, --pause              Pause container during commit (default true)
PS C:\Users\Jalen> docker commit -a 'Mahal Q. Siya' -m 'Added ping utility.' 9d1 brogelio/ping
sha256:83c7ce3d5bf27fc2bce1473427a4a95ee87e2c5421d818572470d47a27a4831b
PS C:\Users\Jalen> docker images
REPOSITORY    TAG       IMAGE ID       CREATED        SIZE
brogelio/ping latest    83c7ce3d5bf2   13 seconds ago 170MB
ubuntu        16.04     9ff95a467e45   4 weeks ago   135MB
PS C:\Users\Jalen> docker run -it --rm brogelio/ping /bin/bash
root@60aa05a7b2f5:/# ping google.com
PING google.com (172.217.160.110) 56(84) bytes of data.
64 bytes from 172.217.160.110: icmp_seq=1 ttl=37 time=49.5 ms
64 bytes from 172.217.160.110: icmp_seq=2 ttl=37 time=59.0 ms
64 bytes from 172.217.160.110: icmp_seq=3 ttl=37 time=52.9 ms
64 bytes from 172.217.160.110: icmp_seq=4 ttl=37 time=44.8 ms
64 bytes from 172.217.160.110: icmp_seq=5 ttl=37 time=78.3 ms
^C
--- google.com ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4005ms
rtt min/avg/max/mdev = 44.851/56.957/78.353/11.662 ms

```

### 3. Building Images

```
PS C:\Users\Jalen> docker images
REPOSITORY    TAG       IMAGE ID       CREATED        SIZE
brogelio/ping latest    83c7ce3d5bf2   3 minutes ago 170MB
ubuntu        16.04     9ff95a467e45   4 weeks ago   135MB
PS C:\Users\Jalen> docker rmi 83c7
Untagged: brogelio/ping:latest
Deleted: sha256:83c7ce3d5bf27fc2bce1473427a4a95ee87e2c5421d818572470d47a27a4831b
Deleted: sha256:a9a09645e677de36d2c4c626a99e140932aa9180ced69ef89d264a1608ff38fe
PS C:\Users\Jalen> docker images
REPOSITORY    TAG       IMAGE ID       CREATED        SIZE
ubuntu        16.04     9ff95a467e45   4 weeks ago   135MB

PS C:\Users\Jalen\Documents\[Git]\ME8_Containerization_and_Docker\3-building_images> docker build -t 'brogelio/ping' .
[+] Building 75.1s (6/6) FINISHED
=> [internal] load build definition from Dockerfile
=> => transferring dockerfile: 360B
=> [internal] load .dockerignore
=> => transferring context: 2B
=> [internal] load metadata for docker.io/library/ubuntu:16.04
=> [1/2] FROM docker.io/library/ubuntu:16.04
=> [2/2] RUN apt-get update && apt-get install -y iputils-ping && apt-get clean && cd /var/lib/apt/lists
=> exporting to image
=> exporting layers
=> writing image sha256:fee09f9cf71dee1eaa0089f03b0ed7e20502ee040c2f46bf9b5e48cdaa2c722
=> naming to docker.io/brogelio/ping

Use 'docker scan' to run Snyk tests against images to find vulnerabilities and learn how to fix them
PS C:\Users\Jalen\Documents\[Git]\ME8_Containerization_and_Docker\3-building_images>

                                                                    docker build -t 'brogelio/ping' .
[+] Building 0.3s (6/6) FINISHED
=> [internal] load build definition from Dockerfile
=> => transferring dockerfile: 32B
=> [internal] load .dockerignore
=> => transferring context: 2B
=> [internal] load metadata for docker.io/library/ubuntu:16.04
=> [1/2] FROM docker.io/library/ubuntu:16.04
=> CACHED [2/2] RUN apt-get update && apt-get install -y iputils-ping && apt-get clean && cd /var/lib/apt
=> exporting to image
=> exporting layers
=> writing image sha256:fee09f9cf71dee1eaa0089f03b0ed7e20502ee040c2f46bf9b5e48cdaa2c722
=> naming to docker.io/brogelio/ping

Use 'docker scan' to run Snyk tests against images to find vulnerabilities and learn how to fix them
PS C:\Users\Jalen\Documents\[Git]\ME8_Containerization_and_Docker\3-building_images> docker images
REPOSITORY    TAG       IMAGE ID       CREATED        SIZE
brogelio/ping latest    fee09f9cf71d   10 minutes ago 139MB
ubuntu        16.04     9ff95a467e45   4 weeks ago   135MB
PS C:\Users\Jalen\Documents\[Git]\ME8_Containerization_and_Docker\3-building_images> 
```

```
PS C:\Users\Jalen\Documents\[Git]\ME8_Containerization_and_Docker\3-building_images> docker run -it brogelio/ping
PING google.com (216.58.200.238) 56(84) bytes of data.
64 bytes from 216.58.200.238: icmp_seq=1 ttl=37 time=85.4 ms
64 bytes from 216.58.200.238: icmp_seq=2 ttl=37 time=49.1 ms
64 bytes from 216.58.200.238: icmp_seq=3 ttl=37 time=45.5 ms
^C
--- google.com ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2003ms
rtt min/avg/max/mdev = 45.570/60.067/85.454/18.012 ms
```

### 4. Sharing Images

```
Login Succeeded
PS C:\Users\Jalen\Documents\[Git]\ME8_Containerization_and_Docker\4-sharing_images> docker search kafka
NAME                DESCRIPTION                               STARS   OFFICIAL   AUTOMATED
wurstmeister/kafka  Multi-Broker Apache Kafka Image          1377    [OK]
spotify/kafka       A simple docker image with both Kafka and Zo...  413    [OK]
bitnami/kafka        Apache Kafka is a distributed streaming plat...  243    [OK]
sheepkiller/kafka-manager  kafka-manager                             204    [OK]
kafkamanager/kafka-manager  Docker image for Kafka manager            125
ches/kafka           Apache Kafka. Tagged versions. JMX. Cluster-...  117    [OK]
hlebalbau/kafka-manager  CMAK (previous known as Kafka Manager) As Do...  83     [OK]
```

```

PS C:\Users\Jalen\Documents\[Git]\ME8_Containerization_and_Docker\4-sharing_images> docker pull wurstmeister/kafka
Using default tag: latest
latest: Pulling from wurstmeister/kafka
540db60ca938: Pull complete
789c480dd801: Pull complete
0705a4c47ffe: Pull complete
661f40345821: Pull complete
a84fa3c6a2b3: Pull complete
Digest: sha256:4bad02cf8f07d0bf65d5cc73cce7aa75f9a90e32b585f867fce7c3fff229bd6d
Status: Downloaded newer image for wurstmeister/kafka:latest
docker.io/wurstmeister/kafka:latest
PS C:\Users\Jalen\Documents\[Git]\ME8_Containerization_and_Docker\4-sharing_images> docker images
REPOSITORY          TAG             IMAGE ID        CREATED         SIZE
brogelio/ping        latest          fee09f9cf71d   28 minutes ago  139MB
wurstmeister/kafka   latest         c3b059ede60e   10 days ago    507MB
ubuntu               16.04          9ff95a467e45   4 weeks ago    135MB
PS C:\Users\Jalen\Documents\[Git]\ME8_Containerization_and_Docker\4-sharing_images> docker tag brogelio/ping:1.0
"docker tag" requires exactly 2 arguments.
See 'docker tag --help'.

Usage:  docker tag SOURCE_IMAGE[:TAG] TARGET_IMAGE[:TAG]

Create a tag TARGET_IMAGE that refers to SOURCE_IMAGE
PS C:\Users\Jalen\Documents\[Git]\ME8_Containerization_and_Docker\4-sharing_images> docker tag brogelio/ping brogelio/ping:1.0
PS C:\Users\Jalen\Documents\[Git]\ME8_Containerization_and_Docker\4-sharing_images> docker images
REPOSITORY          TAG             IMAGE ID        CREATED         SIZE
brogelio/ping        1.0             fee09f9cf71d   31 minutes ago  139MB
brogelio/ping        latest          fee09f9cf71d   31 minutes ago  139MB
wurstmeister/kafka   latest         c3b059ede60e   10 days ago    507MB
ubuntu               16.04          9ff95a467e45   4 weeks ago    135MB

```

## 5. Volumes

```

PS C:\Users\Jalen\Documents\[Git]\ME8_Containerization_and_Docker\5-volumes> docker run --rm -d --name apache -p 80:80 httpd:2.4
9e9a11c624b148a73b23f27a2a8d670435a47c0678545412b2bfa9533f3e7730
PS C:\Users\Jalen\Documents\[Git]\ME8_Containerization_and_Docker\5-volumes> curl localhost

statusCode      : 200
StatusDescription : OK
Content         : <html><body><h1>It works!</h1></body></html>

RawContent      : HTTP/1.1 200 OK
                  Keep-Alive: timeout=5, max=100
                  Connection: Keep-Alive
                  Accept-Ranges: bytes
                  Content-Length: 45
                  Content-Type: text/html
                  Date: Thu, 17 Jun 2021 22:20:20 GMT
                  ETag: "2d-432a5e4a73a80..."

Forms           : {}
Headers         : {[Keep-Alive, timeout=5, max=100], [Connection, Keep-Alive], [Accept-Ranges, bytes], [Content-Length, 45]...}
Images          : {}
InputFields     : {}
Links           : {}
ParsedHtml      : mshtml.HTMLDocumentClass
RawContentLength : 45

PS C:\Users\Jalen\Documents\[Git]\ME8_Containerization_and_Docker\5-volumes> docker volume ls
DRIVER      VOLUME NAME
PS C:\Users\Jalen\Documents\[Git]\ME8_Containerization_and_Docker\5-volumes> docker volume create
0ad1a37353504ebf64b1ddf444a9608fec97ca6330e90d1cf8fb30b1d6bc154d
PS C:\Users\Jalen\Documents\[Git]\ME8_Containerization_and_Docker\5-volumes> docker volume ls
DRIVER      VOLUME NAME
local       0ad1a37353504ebf64b1ddf444a9608fec97ca6330e90d1cf8fb30b1d6bc154d

PS C:\Users\Jalen\Documents\[Git]\ME8_Containerization_and_Docker\5-volumes> docker volume rm 0ad1a37353504ebf64b1ddf444a9608fec97ca6330e90d1cf8fb30b1d6bc154d
0ad1a37353504ebf64b1ddf444a9608fec97ca6330e90d1cf8fb30b1d6bc154d
PS C:\Users\Jalen\Documents\[Git]\ME8_Containerization_and_Docker\5-volumes>

```

```

PS C:\Users\Jalen\Documents\[Git]\ME8_Containerization_and_Docker\5-volumes> docker volume create httpd_htdocs
httpd_htdocs
PS C:\Users\Jalen\Documents\[Git]\ME8_Containerization_and_Docker\5-volumes> docker run --rm -d --name apache -p 80:80 -v ht
pd_htdocs:/usr/local/apache2/htdocs/ httpd:2.4
docker: Error response from daemon: Conflict. The container name "/apache" is already in use by container "9e9a11c624b148a73b
23f27a2a8d670435a47c0678545412b2bfa9533f3e7730". You have to remove (or rename) that container to be able to reuse that name.
See 'docker run --help'.
PS C:\Users\Jalen\Documents\[Git]\ME8_Containerization_and_Docker\5-volumes> docker volume ls
DRIVER      VOLUME NAME
local       httpd_htdocs
PS C:\Users\Jalen\Documents\[Git]\ME8_Containerization_and_Docker\5-volumes> docker run --rm -d --name apache -p 80:80 -v ht
pd_htdocs:/usr/local/apache2/htdocs/ httpd:2.4
docker: Error response from daemon: Conflict. The container name "/apache" is already in use by container "9e9a11c624b148a73b
23f27a2a8d670435a47c0678545412b2bfa9533f3e7730". You have to remove (or rename) that container to be able to reuse that name.
See 'docker run --help'.
PS C:\Users\Jalen\Documents\[Git]\ME8_Containerization_and_Docker\5-volumes> docker images
REPOSITORY    TAG       IMAGE ID       CREATED        SIZE
brogelio/ping  1.0       fee09f9cf71d   About an hour ago   139MB
brogelio/ping  latest    fee09f9cf71d   About an hour ago   139MB
wurstmestei/kafka  latest    c3b059ede60e   10 days ago        507MB
httpd          2.4       39c2d1c93266   3 weeks ago         138MB
ubuntu         16.04     9ff95a467e45   4 weeks ago         135MB
PS C:\Users\Jalen\Documents\[Git]\ME8_Containerization_and_Docker\5-volumes> docker volume rm 9e9a11c624b148a73b23f27a2a8d670
435a47c0678545412b2bfa9533f3e7730
Error: No such volume: 9e9a11c624b148a73b23f27a2a8d670435a47c0678545412b2bfa9533f3e7730
PS C:\Users\Jalen\Documents\[Git]\ME8_Containerization_and_Docker\5-volumes> docker run --rm -d --name apache1 -p 80:80 -v ht
pd_htdocs:/usr/local/apache2/htdocs/ httpd:2.4
75a28a67f43fe6a49502251793a9092fbb128d00033adb6f6127ccdc422dcd6d
docker: Error response from daemon: driver failed programming external connectivity on endpoint apache1 (cf49b12bfc27d189e267
eaa31d9e9b899bd48ee72317cf6cdc7b170038b63f70): Bind for 0.0.0.0:80 failed: port is already allocated.
PS C:\Users\Jalen\Documents\[Git]\ME8_Containerization_and_Docker\5-volumes> docker run --rm -d --name apache1 -p 80:81 -v ht
pd_htdocs:/usr/local/apache2/htdocs/ httpd:2.4
b72282daa57933bec57042b8abeb3436d93b35c88b02efa8be1774fdac65ffec
docker: Error response from daemon: driver failed programming external connectivity on endpoint apache1 (49cbe38a51c6b1ab2e48
c732bed9c8b977939a1a423d59e946e83bd58632e429): Bind for 0.0.0.0:80 failed: port is already allocated.
PS C:\Users\Jalen\Documents\[Git]\ME8_Containerization_and_Docker\5-volumes> docker run --rm -d --name apache1 -p 81:81 -v ht
pd_htdocs:/usr/local/apache2/htdocs/ httpd:2.4
f3fe173cd6bab0c233f67e518a8e553f008e438d6354a14656de6cf759b66026
PS C:\Users\Jalen\Documents\[Git]\ME8_Containerization_and_Docker\5-volumes> docker cp index.html apache:/usr/local/apache2/h
tdocs/

```

```

PS C:\Users\Jalen\Documents\[Git]\ME8_Containerization_and_Docker\5-volumes> curl

cmdlet Invoke-WebRequest at command pipeline position 1
Supply values for the following parameters:
Uri: localhost

StatusCode      : 200
StatusDescription : OK
Content          : <html><body><h1>It works in Docker!</h1></body></html>

RawContent      : HTTP/1.1 200 OK
                  Keep-Alive: timeout=5, max=100
                  Connection: Keep-Alive
                  Accept-Ranges: bytes
                  Content-Length: 56
                  Content-Type: text/html
                  Date: Thu, 17 Jun 2021 22:35:05 GMT
                  ETag: "38-5c4fac693db00...

Forms           : {}
Headers         : {[Keep-Alive, timeout=5, max=100], [Connection, Keep-Alive], [Accept-Ranges, bytes], [Content-Length,
56]...}
Images          : {}
InputFields     : {}
Links           : {}
ParsedHtml      : mshtml.HTMLDocumentClass
RawContentLength : 56

PS C:\Users\Jalen\Documents\[Git]\ME8_Containerization_and_Docker\5-volumes> docker stop apache
apache

```

```

PS C:\Users\Jalen\Documents\[Git]\ME8_Containerization_and_Docker\5-volumes> docker run --rm -d --name apache -p 80:80 httpd:2.4
d0ab6e0827c46f27d85d201555ea12fe66005c4a4a52a9f5a7dc4b15cd927548
PS C:\Users\Jalen\Documents\[Git]\ME8_Containerization_and_Docker\5-volumes> docker run --rm -d --name apache1 -p 81:81 httpd:2.4
docker: Error response from daemon: Conflict. The container name "/apache1" is already in use by container "f3fe173cd6bab0c233f67e518a8e553f008e438d6354a14656de6cf759b66026". You have to remove (or rename) that container to be able to reuse that name.
See 'docker run --help'.
PS C:\Users\Jalen\Documents\[Git]\ME8_Containerization_and_Docker\5-volumes> curl localhost

StatusCode      : 200
StatusDescription : OK
Content         : <html><body><h1>It works!</h1></body></html>

RawContent      : HTTP/1.1 200 OK
                  Keep-Alive: timeout=5, max=100
                  Connection: Keep-Alive
                  Accept-Ranges: bytes
                  Content-Length: 45
                  Content-Type: text/html
                  Date: Thu, 17 Jun 2021 22:40:20 GMT
                  ETag: "2d-432a5e4a73a80..."
Forms           : {}
Headers         : {[Keep-Alive, timeout=5, max=100], [Connection, Keep-Alive], [Accept-Ranges, bytes], [Content-Length, 45]...}
Images          : {}
InputFields     : {}
Links           : {}
ParsedHtml      : mshtml.HTMLDocumentClass
RawContentLength : 45

```

```

Login Succeeded
PS C:\Users\Jalen\Documents\[Git]\ME8_Containerization_and_Docker\5-volumes> docker volume create httpd_htdocs
httpd_htdocs
PS C:\Users\Jalen\Documents\[Git]\ME8_Containerization_and_Docker\5-volumes> docker run --rm -d --name apache -p 80:80 -v httpd_htdocs:/usr/local/apache2/htdocs/ httpd:2.4
6a7e2e6c1b485a421631d97e4e35974bc6e5edd87c1663ddd275d918eb08a543
PS C:\Users\Jalen\Documents\[Git]\ME8_Containerization_and_Docker\5-volumes> docker cp index.html apache:/usr/local/apache2/htdocs/
PS C:\Users\Jalen\Documents\[Git]\ME8_Containerization_and_Docker\5-volumes> curl localhost

StatusCode      : 200
StatusDescription : OK
Content         : <html><body><h1>It works in Docker!</h1></body></html>

RawContent      : HTTP/1.1 200 OK
                  Accept-Ranges: bytes
                  Content-Length: 56
                  Content-Type: text/html
                  Date: Thu, 17 Jun 2021 23:01:05 GMT
                  ETag: "38-5c4fac693db00"
                  Last-Modified: Thu, 17 Jun 2021 18:57:16 GMT
                  Server:...
Forms           : {}
Headers         : {[Accept-Ranges, bytes], [Content-Length, 56], [Content-Type, text/html], [Date, Thu, 17 Jun 2021 23:01:05 GMT]...}
Images          : {}
InputFields     : {}
Links           : {}
ParsedHtml      : mshtml.HTMLDocumentClass
RawContentLength : 56

```

## 6. Networking

```

PS C:\Users\Jalen\Documents\[Git]\ME8_Containerization_and_Docker\6-networking> docker network ls
NETWORK ID      NAME      DRIVER      SCOPE
79dc3ed30547    bridge   bridge      local
27844c2eeba3    host     host        local
defd1b8e8d15    none     null        local
PS C:\Users\Jalen\Documents\[Git]\ME8_Containerization_and_Docker\6-networking> docker network inspect bridge
[
  {
    "Name": "bridge",
    "Id": "79dc3ed30547a8b564dead7d6c02cb88d433734514f2c62f9222d0ddfd3cd126e",
    "Created": "2021-06-17T18:15:56.7613518Z",
    "Scope": "local",
    "Driver": "bridge",
    "EnableIPv6": false,

```



```
PS C:\Users\Jalen\Documents\[Git]\ME8_Containerization_and_Docker\6-networking> docker run --rm -d --name dummy brogelio/ping:1.0
f9d5282fedf1c210082910b2fee4686ffff3f1924228bc984512a8dac60c33924
PS C:\Users\Jalen\Documents\[Git]\ME8_Containerization_and_Docker\6-networking> docker network inspect bridge
[
  {
    "Name": "bridge",
    "Id": "79dc3ed30547a8b564dead7d6c02cb88d433734514f2c62f9222d0ddf3cd126e",
    "Created": "2021-06-17T18:15:56.7613518Z",
    "Scope": "local",
    "Driver": "bridge",
    "EnableIPv6": false,
    "IPAM": {
      "Driver": "default",
      "Options": null,
      "Config": [
        {
          "Subnet": "172.17.0.0/16"
        }
      ]
    }
  }
]
```

```
PS C:\Users\Jalen\Documents\[Git]\ME8_Containerization_and_Docker\6-networking> docker run --rm -d -e PING_TARGET=172.17.0.2 --name pinger brogelio/ping:1.0
7779f880c5ff91c96e92ca6e5c03f0f7e2e4d0a055157ee78078997c7b3fda2c
PS C:\Users\Jalen\Documents\[Git]\ME8_Containerization_and_Docker\6-networking> docker ps
CONTAINER ID   IMAGE          COMMAND                  CREATED        STATUS        PORTS          NAMES
7779f880c5ff   brogelio/ping:1.0  "sh -c 'ping $PING_T..."  14 seconds ago  Up 11 seconds          pinger
f9d5282fedf1   brogelio/ping:1.0  "sh -c 'ping $PING_T..."  2 minutes ago   Up 2 minutes          dummy
PS C:\Users\Jalen\Documents\[Git]\ME8_Containerization_and_Docker\6-networking> docker logs pinger
PING 172.17.0.2 (172.17.0.2) 56(84) bytes of data.
64 bytes from 172.17.0.2: icmp_seq=1 ttl=64 time=0.121 ms
64 bytes from 172.17.0.2: icmp_seq=2 ttl=64 time=0.071 ms
64 bytes from 172.17.0.2: icmp_seq=3 ttl=64 time=0.071 ms
64 bytes from 172.17.0.2: icmp_seq=4 ttl=64 time=0.261 ms
64 bytes from 172.17.0.2: icmp_seq=5 ttl=64 time=0.377 ms
64 bytes from 172.17.0.2: icmp_seq=6 ttl=64 time=0.084 ms
64 bytes from 172.17.0.2: icmp_seq=7 ttl=64 time=0.077 ms
64 bytes from 172.17.0.2: icmp_seq=8 ttl=64 time=0.093 ms
```

```
PS C:\Users\Jalen\Documents\[Git]\ME8_Containerization_and_Docker\6-networking> docker network create skynet
9280cd3f2d346bfc66322fe61d0a458b4a9c038c577547b95491250b152b558
PS C:\Users\Jalen\Documents\[Git]\ME8_Containerization_and_Docker\6-networking> docker network ls
NETWORK ID     NAME      DRIVER    SCOPE
79dc3ed30547   bridge    bridge    local
27844c2eeba3   host      host      local
defd1b8e8d15   none      null      local
9280cd3f2d34   skynet    bridge    local
PS C:\Users\Jalen\Documents\[Git]\ME8_Containerization_and_Docker\6-networking>
```

```
PS C:\Users\Jalen\Documents\[Git]\ME8_Containerization_and_Docker\6-networking> docker network inspect skynet
[
  {
    "Name": "skynet",
    "Id": "9280cd3f2d346bfc66322fe61d0a458b4a9c038c577547b95491250b152b558",
    "Created": "2021-06-17T23:26:23.96117Z",
    "Scope": "local",
    "Driver": "bridge",
    "EnableIPv6": false,
    "IPAM": {
      "Driver": "default",
      "Options": null,
      "Config": [
        {
          "Subnet": "172.17.0.0/16"
        }
      ]
    }
  }
]
```

```
PS C:\Users\Jalen\Documents\[Git]\ME8_Containerization_and_Docker\6-networking> docker run --rm -d --name widgetdb -e POSTGRES_PASSWORD=password --network skynet -p 5432 postgres
b5ffdf1937f58de9cc324fc162ab1395f81b2b284956f0153ac2a40f0016885a
PS C:\Users\Jalen\Documents\[Git]\ME8_Containerization_and_Docker\6-networking> docker ps
CONTAINER ID   IMAGE          COMMAND                  CREATED        STATUS        PORTS          NAMES
b5ffdf1937f5   postgres      "docker-entrypoint.s..."  12 hours ago   Up 4 seconds   0.0.0.0:65509->5432/tcp   widgetdb
PS C:\Users\Jalen\Documents\[Git]\ME8_Containerization_and_Docker\6-networking> docker run --rm -d --name gadgetdb -e POSTGRES_PASSWORD=password --network skynet -p 5432 postgres
a19da5c3dc88700f52244de11608d4a441964edde384392280fa7548f5d1adae
PS C:\Users\Jalen\Documents\[Git]\ME8_Containerization_and_Docker\6-networking> docker ps
CONTAINER ID   IMAGE          COMMAND                  CREATED        STATUS        PORTS          NAMES
a19da5c3dc88   postgres      "docker-entrypoint.s..."  12 hours ago   Up 3 seconds   0.0.0.0:49677->5432/tcp   gadgetdb
b5ffdf1937f5   postgres      "docker-entrypoint.s..."  12 hours ago   Up 23 seconds   0.0.0.0:65509->5432/tcp   widgetdb
PS C:\Users\Jalen\Documents\[Git]\ME8_Containerization_and_Docker\6-networking> docker exec -it widgetdb /bin/bash
root@b5ffdf1937f5:/# psql -U postgres
psql (13.3 (Debian 13.3-1.pgdg100+1))
Type "help" for help.

postgres=# \q
root@b5ffdf1937f5:/# psql -U postgres -h gadgetdb
Password for user postgres:
psql (13.3 (Debian 13.3-1.pgdg100+1))
Type "help" for help.

postgres=# \q
root@b5ffdf1937f5:/# exit
exit
```

```
PS C:\Users\Jalen\Documents\[Git]\ME8_Containerization_and_Docker\6-networking> docker stop widgetdb gadgetdb
widgetdb
gadgetdb
PS C:\Users\Jalen\Documents\[Git]\ME8_Containerization_and_Docker\6-networking> docker run --rm -d --name widgetdb -e POSTGRES_PASSWORD=password --network skynet -p 5432:5432 postgres
6087fd38a6ddb34daaaa7de86088924f626bfc5ab6200abd1cff73115431491

PS C:\Users\Jalen\Documents\[Git]\ME8_Containerization_and_Docker\6-networking> docker exec -it widgetdb /bin/bash
root@6087fd38a6dd:/# psql -U postgres -h localhost
psql (13.3 (Debian 13.3-1.pgdg100+1))
Type "help" for help.

postgres=# \q
root@6087fd38a6dd:/# exit
exit
PS C:\Users\Jalen\Documents\[Git]\ME8_Containerization_and_Docker\6-networking> docker stop widgetdb
widgetdb
PS C:\Users\Jalen\Documents\[Git]\ME8_Containerization_and_Docker\6-networking> docker ps
CONTAINER ID   IMAGE      COMMAND                  CREATED        STATUS        PORTS          NAMES
PS C:\Users\Jalen\Documents\[Git]\ME8_Containerization_and_Docker\6-networking>
```